DoD and Coordinated Bird Monitoring (CBM)

Report Documentation Page

Form Approved
OMB No. 0704-0188

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
01 AUG 2004	**N/A**	**-**

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
DoD and Coordinated Bird Monitoring (CBM)	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER
	5e. TASK NUMBER
	5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **US Geological Survey (USGS)**	8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release, distribution unlimited

13. SUPPLEMENTARY NOTES
See also ADM002111. Department of Defense Conservation Conference. Held in Savannah, Georgia on August 22-27, 2004, The original document contains color images.

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT **unclassified**	b. ABSTRACT **unclassified**	c. THIS PAGE **unclassified**	**UU**	**38**	

Introduction

- Work by the bird initiatives, especially landbirds and shorebirds, NABCI, IAFWA, and many organizations involved with bird monitoring
- Effort to increase efficiency and utility of bird monitoring through improved coordination:
  - Between the initiatives
  - Between field workers and statisticians
  - Between decision-makers and technical experts

Introduction

- Vision: that monitoring be management-driven, science-based, scale-dependent, and implemented through partnerships.
- CBM is a movement and an approach
- No authority to compel anyone to do anything; just a bunch of advice

History

- Started by Partners in Flight in late 1990s in the western US
- Expanded throughout the US, and some of Canada, during the past 2-3 years

History (cont'd)

- State CBM plans completed for two States and underway for 8-10 others
- Work in the shorebird and landbirds initiatives is continuing
- IAFWA CBM Committee just completing report
- Plans being made to implement its recommendations

Today's Presentation

- Provide summary of recent and planned CBM work.
- Suggest ways it might be useful to DoD.

Overview

- Use a Goals-Objectives-Strategies approach
- Will discuss work on each phase
- Provide advice for short- and long-term projects

Two General Principles

- Monitoring design should be based on management needs.
- Coordination should occur at the scale of the management issue.

Goals: Short-term projects

- Nevada
  - Importance of juniper to birds in NV
  - Success of riparian restoration projects
  - Models predicting effect of water levels
- Mid-Atlantic States
  - Effectiveness of ROW management
  - Importance of stop-over habitat for landbirds
  - Black rail population size

Goals: Coordination

Management Issue	NJ	DE	MD	NY	CT	VA	PA	Selected?
Forest health	X	X		X	X	X	X	Yes
Early succ'l hab.	X		X	X	X		X	Yes
Freshwater wetlds.	X	X	X	X		X	X	Yes
Migration habitat	X	X	X	X	X		X	Yes
Tidal marsh hab.		X	X	X	X	X	X	Yes
Wind power		X	X	X			X	Yes
Contaminants	X	X			X			No
End'd species	X	X						No

Goals: Long-term projects

- Many goals, some not well known initially
  - National Petroleum Reserve of Alaska
  - Use of Breeding Bird Survey data
    - research articles
    - estimating population size

Goals: Long-term projects

- Determine whether species of special concern need additional protection.
- Determine causes of declines and ways to reverse them.
- Identify critical habitats for species of special concern.
- Determine the conditions required for viable populations.
- Identify areas of highest priority for acquisition or restoration.
- Set habitat objectives by species, region, and season.
- Evaluate and refine large-scale conservation efforts.

Objectives

- Biological population
  - Focal species
  - Study area
  - Study period
- Information needed
- Quantitative objectives
  - Parameters
  - Accuracy target for each

Objectives: Short-term projects

- Common products
  - Population size or change in size
  - Demographic rate(s)
  - Habitat relationships
- Examples from the Nevada CBM Plan
  - Population size in juniper (cv < 0.2)
  - Chg in pop'n size in riparian areas (power)
  - Regr. coef. for wetlands model (cv<0.5)

Objectives: Long-term projects

- Work by landbird and shorebird initiatives
- Goal for abundance monitoring
  - 80% power to detect a 50% decline occurring during no more than 20 years using a two-tailed test...
- Work needed for population size, ...

Strategies: "Design of Bird Surveys"

- Introduction
  - Reasons to Survey Bird Populations
- Major Components of the Monitoring Plan
  - Management Issues Addressed
  - Monitoring Objectives
  - Strategies
- Survey Design
  - Components of Accuracy
  - Index methods
  - Double Sampling
  - Habitat Information
  - Procedures for Aquatic Areas
  - Estimating Trends
  - Estimating Abundance
  - Estimating Demographic Rates
  - Specific Surveys
- Literature Cited

Design of Bird Surveys (cont'd)

- Survey Types: Point counts, area searches, migration counts, aerial surveys, nest success, ...
- Topics: Parameter definition, sampling plans, field methods, potential bias, power and sample size formulas, point and interval estimates.
- Orientation: quantitative

Strategies: short-term projects

- "Guidelines from Short-term Projects"
  - Brief description
  - Statistical population
  - Sampling plan
  - Training and field methods
  - Sample size requirements
  - Analytic methods
  - Data management
  - Reports
- Examples from Nevada, Idaho, mid-Atlantic states

Needed long-term surveys for non-game birds

- BBS and similar programs
- Migration monitoring (landbirds)
- Wetland bird surveys (year round)
  - aerial surveys
  - ground-based, diurnal surveys (productivity, abundance)
  - secretive marshbird surveys
- Winter surveys
- Demographic surveys (breeding landbirds)
- Nocturnal landbird surveys
- Colony surveys
- Other surveys

Data Management (long-term surveys)

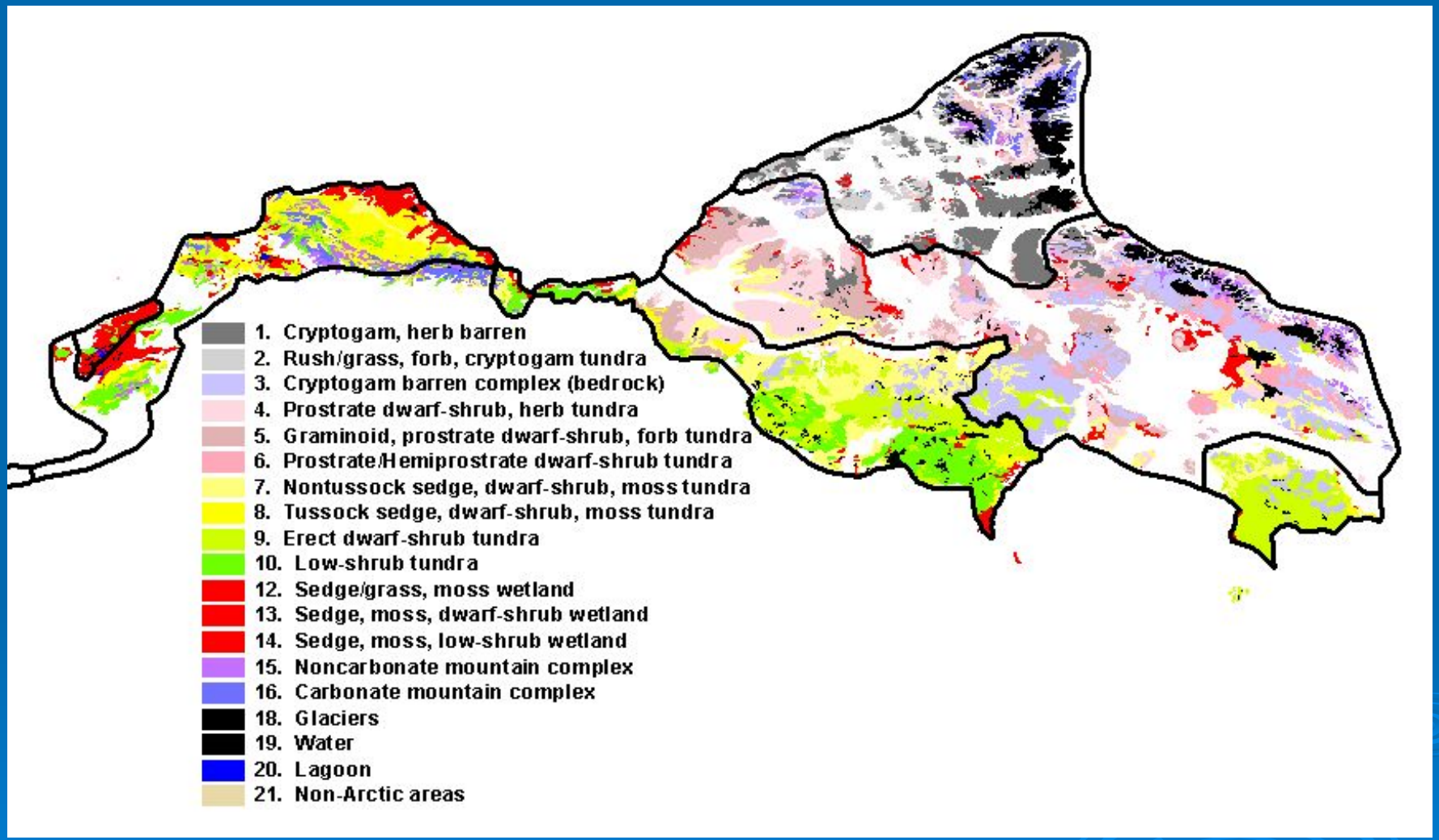
- Agree on methods (so data are similar)
- Central repositories to extent feasible
  - Input via the internet
  - Data freely available to all (except sensitive data)
- Internet-based data network
  - Agree on core variables
  - Data providers write scripts to extract these variables
  - Internet-based program accesses these scripts
- Front-end, user-friendly programs for analysis

Program for Regional and International Shorebird Monitoring (PRISM)

Canadian Shorebird Conservation Plan
U.S. Shorebird Conservation Plan

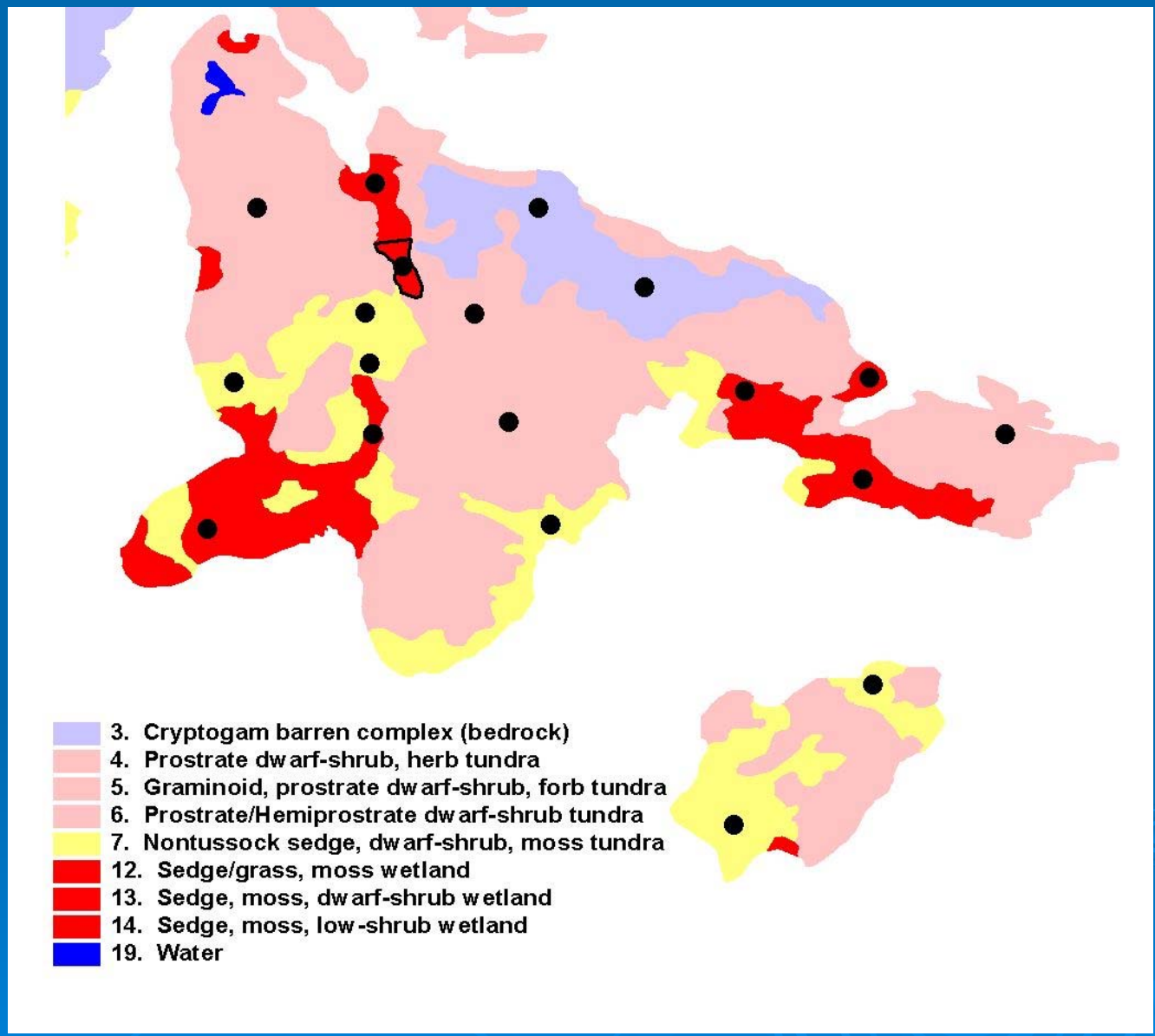
Four-part Approach

- Arctic / boreal breeding surveys - 34 species
- Temperate breeding surveys - 17 species
- Temperate nonbreeding surveys - 38 species
- Neotropical surveys - 14 species

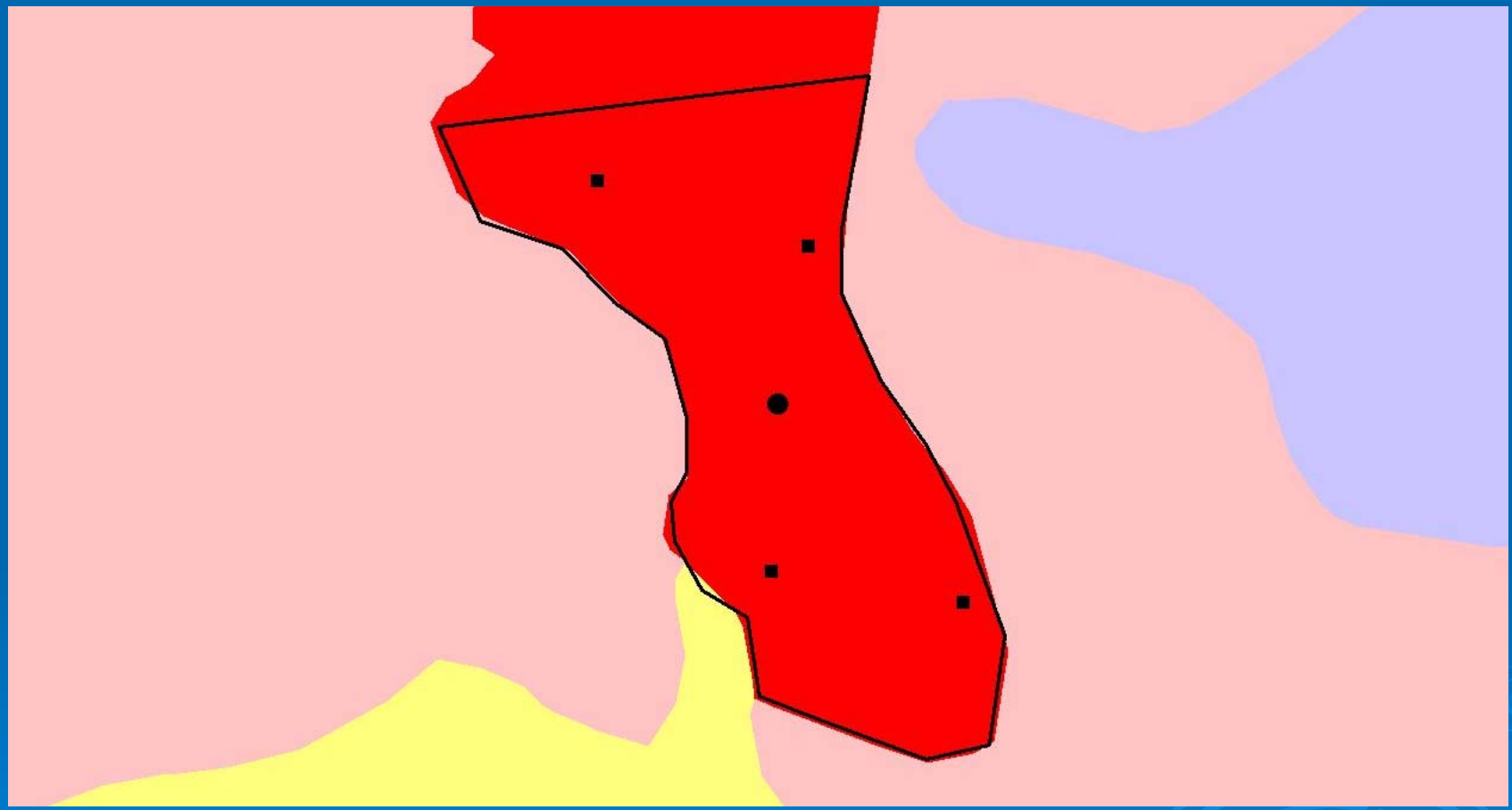

1. Cryptogam, herb barren
2. Rush/grass, forb, cryptogam tundra
3. Cryptogam barren complex (bedrock)
4. Prostrate dwarf-shrub, herb tundra
5. Graminoid, prostrate dwarf-shrub, forb tundra
6. Prostrate/Hemiprostrate dwarf-shrub tundra
7. Nontussock sedge, dwarf-shrub, moss tundra
8. Tussock sedge, dwarf-shrub, moss tundra
9. Erect dwarf-shrub tundra
10. Low-shrub tundra
12. Sedge/grass, moss wetland
13. Sedge, moss, dwarf-shrub wetland
14. Sedge, moss, low-shrub wetland
15. Noncarbonate mountain complex
16. Carbonate mountain complex
18. Glaciers
19. Water
20. Lagoon
21. Non-Arctic areas

Sample stratification of a primary unit

dot = a cluster of plots



Example of a Plot the Follows Natural Borders



Dot = randomly-selected starting point for plot
Squares = randomly (e.g., systematically) selected plots

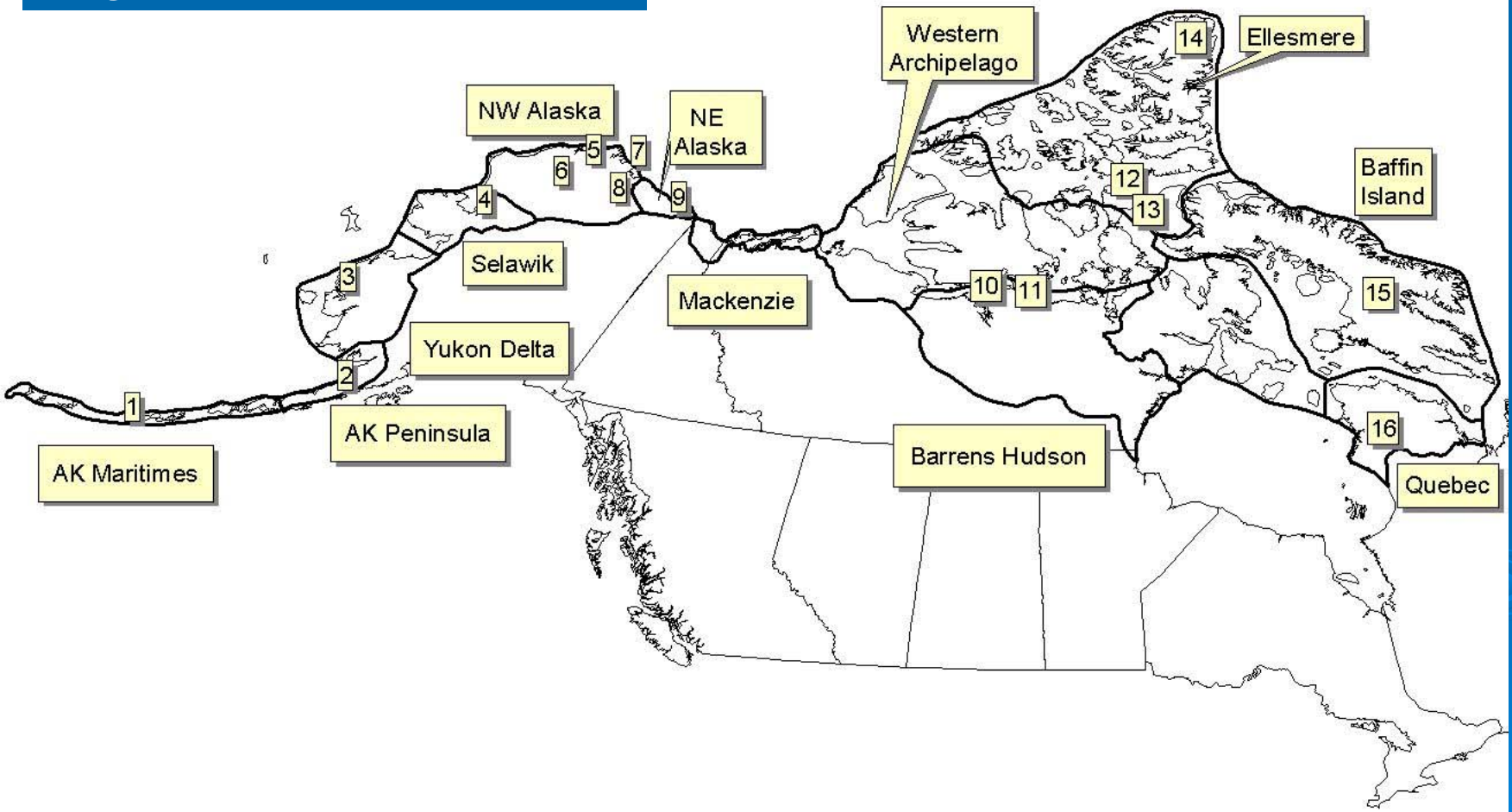
Estimator: the CV

$$C\hat{V}(\hat{Y}_3) = \sum_{h=1}^{H} \left\{ \frac{1}{c_h} \left[g_{h1} + \frac{1}{n_h} \left(g_{h2} + \frac{g_{h3}}{m_h} \right) \right] + \frac{1}{c'_h} \left[g_{h4} + \frac{1}{n'_h} \left(g_{h5} + \frac{1}{m'_h} \left(g_{h6} + \frac{g_{h7}}{o'_h} \right) \right) \right] \right\}$$

h = stratum
g = constants, independent of sample size
c = N of crew years (e.g., 20)
n = clusters/crew year (e.g., 9)
m = plots per cluster (e.g., 4)
n' = intensive clusters/crew year (e.g., 2)
m' = intensive plots/cluster (e.g., 4)
o' = rapid surveys/intensive plot (e.g., 1)

Estimation of the g-values

Regions and field sites



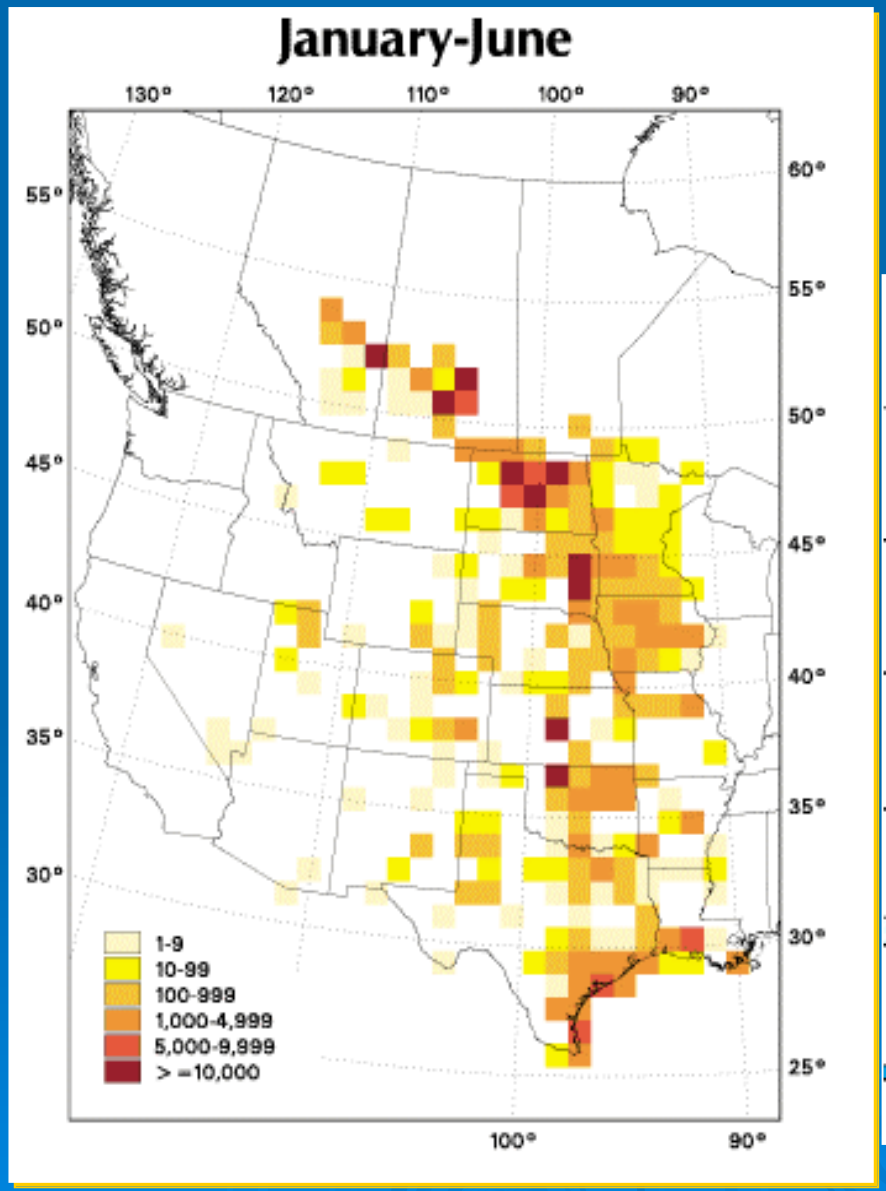
Shorebird Population and Habitat Sampling in Extensive Ephemeral Wetland Systems

Prairie Pothole Region

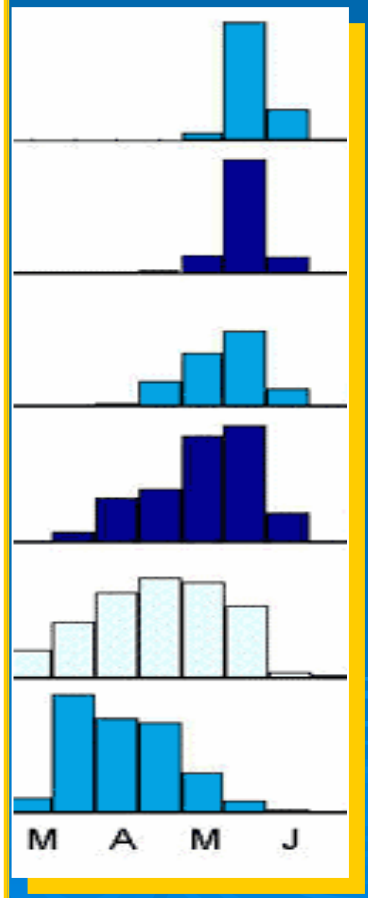
North and South Dakota
western Minnesota

- Identify landscapes with high probabilities of shorebird occurrence
- Develop and test an approach to monitoring
- Model shorebird abundance relative to habitat and landscape attributes and climate

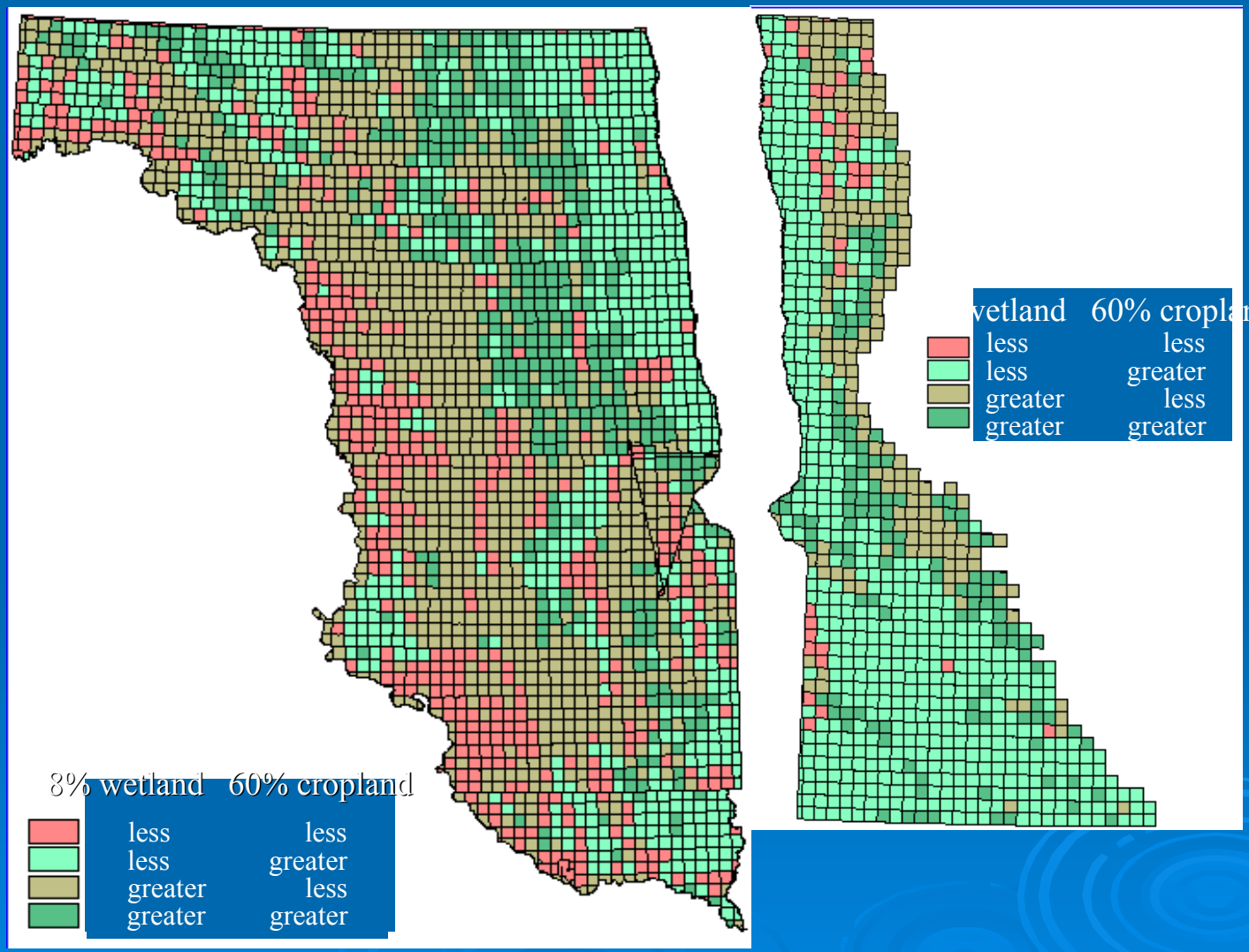
Long distance migrants



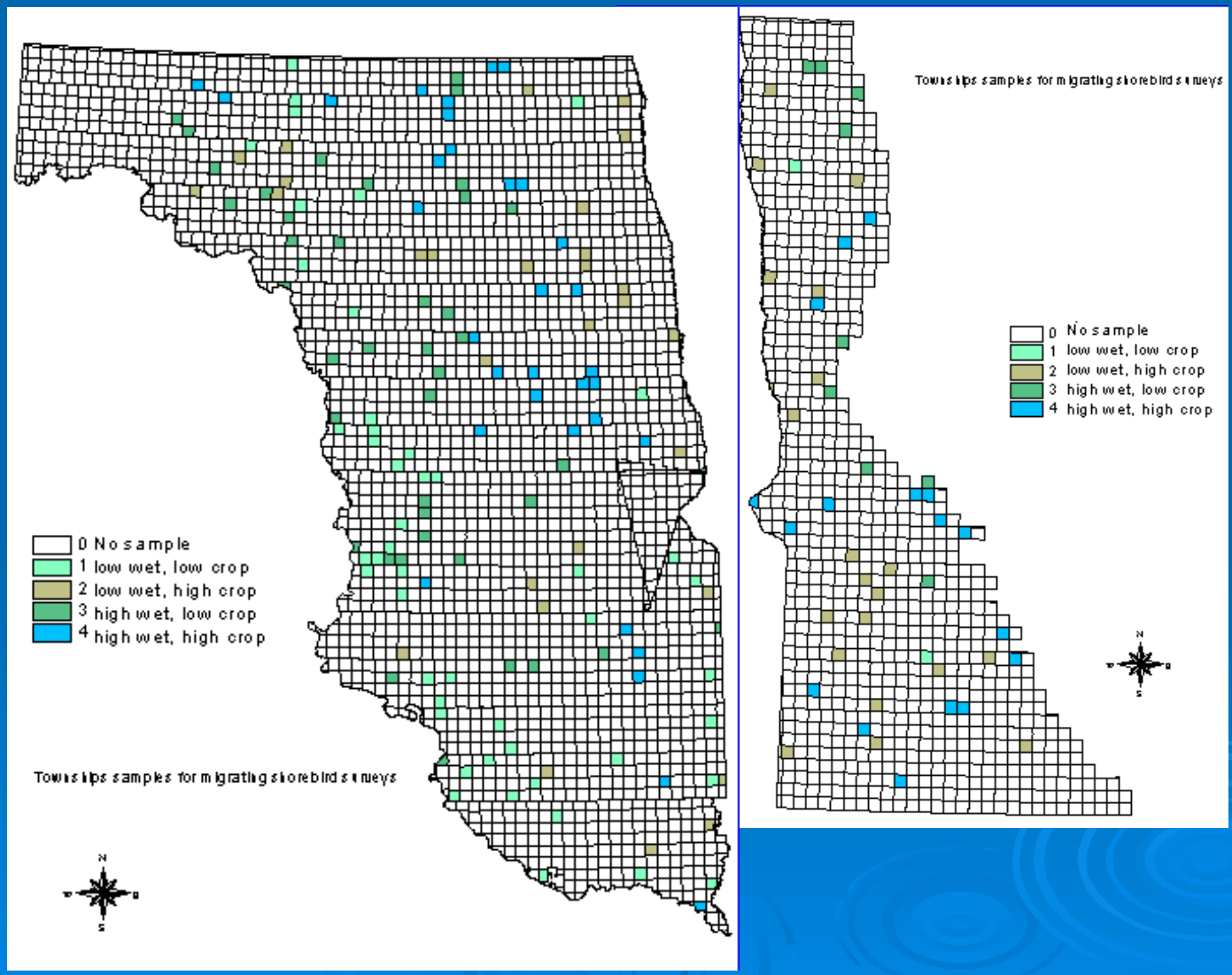
timing



Townships classified into 4 landscape types based on median wetland and cropland areas



Random selection of townships



How CBM can help DoD

- Clarify how monitoring does or can help address management issues of importance to DoD
- Provide state-of-the art, broadly-accepted advice on survey methods
- Help develop long-term surveys of species of special concern on DoD lands

How DoD can help CBM

- Assist in developing methods and agreement on them.
- Encourage use of the “Guidelines for designing short-term projects” and help us improve it.
- Participate in the data management system where appropriate.
- Participate in long-term surveys with level of effort proportional to land base (ie, small effort, but long-term commitment).

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